

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of : Customer Number: 20277  
Soichiro OGAWA : Confirmation Number: 1064  
Application No.: 10/656,227 : Tech Center Art Unit: 1729  
Filed: September 08, 2003 : Examiner: ECHELMEYER, Alix E.  
For: FUEL CELL ASSEMBLY

**APPEAL BRIEF**

Mail Stop Appeal Brief  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is submitted in support of the Notice of Appeal filed August 25, 2011, wherein Appellant appeals from the Primary Examiner's rejection of claims 15-27.

**Real Party In Interest**

This application is assigned to NISSAN MOTOR CO., LTD. by assignment recorded on September 8, 2003, at Reel 014490, Frame 0863.

**Related Appeals and Interferences**

Appellant is unaware of any related appeals and interferences.

**Status of Claims**

1. Claims canceled: 1-14.
2. Claims pending: 15-27.

3. Claims rejected: 15-27.
4. Claims on appeal: 15-27.

#### **Status of Amendments**

No amendments were filed subsequent to the final rejection of May 25, 2011.

#### **Summary of Claimed Subject Matter**

An aspect of the invention, per claim 15, is a fuel cell assembly (1) mounted in a vehicle comprising a fuel cell stack (2) comprising plural fuel cells stacked in a fixed direction and a pair of end plates (4, 5) which are stacked on both ends of the plural fuel cells (page 2, lines 6 to 8; and page 4, lines 1 to 2 of the written description). A stacking bolt (19) penetrates the pair of end plates (4, 5) in the fixed direction and maintains the plural fuel cells in a stacked state (page 4, lines 1 to 6 of the written description). A case (3) houses the fuel cell stack (2), and a bolt (7) penetrates an end plate (4, 5) in a direction perpendicular to the fixed direction, wherein both ends of the bolt (7) are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack (2) (page 2, lines 8 to 9; and page 5, lines 11 to 18 of the written description).

Another aspect of the invention, per claim 18, is a fuel cell assembly (1) mounted in a vehicle comprising a fuel cell stack (2) comprising plural fuel cells stacked in a fixed direction (page 2, lines 6 to 8 of the written description). A stacking bolt (19) is disposed along the fixed direction to maintain the plural fuel cells in a stacked state (page 4, and lines 1 to 6 of the written description). A fluid supply/discharge block (6) is fitted to an end of the fuel cell stack (2) to supply fluid from outside to each of the plural fuel cells and discharge fluid from each of the plural fuel cells to outside (page 3, lines 21 to 24; and page 6, line 14 to page 7, line 8 of the written description). A case (3) houses the fuel cell stack (2) and the fluid supply/discharge block (6), and a bolt (7) penetrates the fluid

supply/discharge block (6) in a direction perpendicular to the fixed direction, wherein both ends of the bolt (7) are fixed to the case (3) to bear a load exerted in the fixed direction by the fuel cell stack (2) (page 2, lines 8 to 9; and page 5, lines 11 to 18 of the written description).

**Grounds of Rejection To Be Reviewed By Appeal**

1. Claims 15-23 and 25-27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Sugita et al. (US 6,455,179) in view of Tanaka et al. (U.S. Pat. No. 6,803,142) and Iwamura (US 6,400,122).  
2. Claim 24 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Sugita et al. view of Tanaka et al. and Iwamura, and further in view of Groppel (US 3,856,573).

**Argument**

**1 Rejection Under 35 U.S.C. § 103(a) as being unpatentable over Sugita et al. in view of Tanaka et al. and Iwamura**

**Claims 15-17**

Examiner's Position:

The Examiner asserted that Sugita et al. teach a fuel cell system having two fuel cell stacks with end plates at both ends (16, 24) for use in a vehicle. The Examiner averred that stacking bolts (154) maintain the cells in a stack. The Examiner acknowledged that Sugita et al. fail to teach a case and that the bolts holding the fuel cell stack to the vehicle penetrate an end plate and the case. The Examiner asserted that Tanaka et al. teach a fuel cell having a housing case (10) that provides mounts (123, 130) for fixing the end plates of the fuel cell and case using bolts (104), and that the mounts give the housing structure that allows it to withstand the load concentration on the mount. The Examiner opined that it would be desirable to use the case of Tanaka et al. to provide protection to the fuel cell

from the outside environment and that it would be desirable to use the mounts of Tanaka et al. to allow the case to withstand the load concentration on the mount and the mounts attach the fuel cell system to the vehicle.

The Examiner admitted that Sugita et al. in view of Tanaka et al. fail to teach that both ends of the bolt are located exterior to the case. The Examiner asserted that Iwamura teaches a through bolt (27) passing through the casing (9) and that the bolt goes from the first side to the second side of the end plate, or casing. The Examiner considered it obvious to extend the bolts (166 a, b) of Tanaka et al. from the first side to the second side of the endplate to prevent loosening of the module.

Appellant's Position:

Sugita et al., Tanaka et al., and Iwamura, whether taken in combination, or taken alone, do not suggest the claimed fuel cell assembly because the cited references do not disclose a fuel cell stack comprising plural fuel cells stacked in a fixed direction, a stacking bolt which penetrates the pair of end plates in the fixed direction and maintain the plural fuel cells in a stacked state, a case housing the fuel cell stack, and a bolt which penetrates an end plate in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack, as required by claim 15.

The fuel cell assembly of claim 15 improves the supporting structure of a vehicle-mounted fuel cell stack by firstly providing a stacking bolt to bear the load exerted in the fixed direction by the fuel cell stack and secondly providing a bolt that penetrates the end plate or fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends thereof are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack. This arrangement of the bolt causes the load exerted in the fixed direction by the fuel cell stack to be distributed over the entire length of the bolt,

thereby achieving an improved supporting structure of a vehicle-mounted fuel cell stack.

**The cited references do not disclose or suggest the claimed bolts**

The Examiner erroneously found that bolt of Sugita et al. in view of Tanaka et al. and Iwamura is the same as the claimed bolt. As explained herein, such a finding can only be arrived at by hindsight reconstruction of the claimed invention using Appellant's disclosure as a roadmap.

In the device of Sugita et al., the bolt shown in Fig. 2 (near the reference sign 162a(b)) is fixed only to a bottom the end plate (24) and does not penetrate the end plate (24) in a direction perpendicular to the fixed direction.

In the device of Tanaka et al., similarly, the bolt (104) is fixed only to a bottom of the end plate (62) (cf. Fig. 3) and does not penetrate the end plate (62) in a direction perpendicular to the fixed direction.

Iwamura shows a through bolt (27) penetrating a case (9) accommodating a plurality of batteries (1). However, the battery (1) is very different from a fuel cell. Further, the batteries (1) shown in Fig. 3 of Iwamura are arranged with a gap. Providing that this direction corresponds to the fixed direction defined in claim 15, it is clear that no load is exerted on the through bolt (27) in the fixed direction by the batteries (1). Hence, the through bolt (27) of Iwamura does not function to bear a load exerted in the fixed direction by the fuel cell stack, as required by claim 15.

A bolt that penetrates the end plate or fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends thereof are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack, according to claim 15, is not disclosed or suggested by any of the cited references.

Claim 15 defines a bolt which penetrates an end plate in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack. According to claim 15, the end plate is one of the pair of end plates which are stacked on both ends of the plural fuel cells.

According to the Examiner, Sugita et al. teach bolts within the brackets that are perpendicular to the fixed direction of the fuel cell stack (170a in Figure 2). The bolt (170a) of Sugita et al. penetrates the attachment plate (31), the rubber mount (168), and the bracket section (160a) of the mounting mechanism (30) and a nut (174) is secured on the protrusion part thereof (Figure 2, col. 6, line 64 through col. 7, line 10).

It is clear that the bolt (170a) of Sugita et al. does not penetrate the end plate. Further, an end of the bolt (170a) of Sugita et al. is fixed to the attachment plate (31) and another end thereof is fixed to the bracket section (160a). The bracket section may be regarded as a part of a case, but the attachment plate (31) is a part of a vehicle (col. 3, lines 27-29). Unlike the bolt (170a) of Sugita et al. the bolt according to claim 15 has both ends that are fixed to the case. The bolt (170a) of Sugita et al. is, therefore, not comparable to the bolt defined in claim 15. Tanaka et al. and Iwamura do not cure these deficiencies of Sugita et al.

The present invention is further distinguishable from any combination of Iwamura with the other cited references because combining Iwamura with Sugita et al. and Tanaka et al., even if it were obvious to do so, and Appellant maintains it is not, would not result in the claimed fuel cell assembly structure.

#### Iwamura does not disclose the stacking direction

The batteries (1) of Iwamura are not stacked like the fuel cells of the present invention, and

therefore, Iwamura does not define a stacking direction. Rather, the batteries of Iwamura are held in place by circular recesses in the supports (2, 3). Hence it is not possible to specify a stacking direction in Iwamura. The fixed direction in claim 15 is defined by the stacking direction of the fuel cells. If there is no defined stacking direction it is not possible to arrange the bolt to penetrate an end plate in a **direction perpendicular to the fixed direction**, or the stacking direction, as in claim 15.

**Iwamura does not disclose both ends of the bolt are located on the exterior of the case**

Further, Iwamura does not disclose that the bolt (27) penetrates the stacked casing (8, 9) such that both ends of the bolt are located on the exterior of the case, as required by claim 15. There is no disclosure or figure showing both ends of bolt (27) are located on the exterior of casings (8, 9) to support the fuel cell stack to the casings (8, 9).

**Iwamura does not disclose both claimed bolts**

Furthermore, the Examiner does not specify which bolt is the stacking bolt in Iwamura. If the bolt (27) of Iwamura corresponds to the bolt which penetrates an end plate of claim 15, there must be a stacking bolt that is perpendicular to the bolt (27). Iwamura, however, does not disclose or suggest such a stacking bolt.

The Examiner found, "Iwamura further teaches a through bolt 27 passing through the casing (9), which serves as an endplate because it is located at the end of the row batteries and holds them in a row" (final Office Action, page 6, lines 3-5). The bolts (27), however, do not hold the batteries in a row. As clearly shown in Figs. 2 and 3, the batteries are held in rows by the recess in the supports (2, 3).

While the Examiner might consider the batteries (1) of Iwamura shown in FIG. 6 are stacked

horizontally and the members (9) serve as the end plates as a result of the bolts (27) penetrating each of the members (9), this interpretation of Iwamura would not suggest the claimed fuel cell structure, because there is **no stacking bolt** in Iwamura, which penetrates the pair of end plates or fluid supply/discharge block in the fixed direction and maintains the plural fuel cells in a stacked state.

Claim 15 requires both a stacking bolt in the fixed direction and a **bolt** which penetrates an end plate in a **direction perpendicular to the fixed direction, wherein both ends** of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack. No combination of the cited references suggests the specific configuration of the fuel cell stacks, stacking bolt, and bolt which penetrates an end plate.

It is readily apparent that the Examiner's basis for concluding that it would have been obvious to combine the cited references in the manner asserted is rooted in impermissible hindsight reasoning in view of Appellant's disclosure.

#### Hindsight reasoning

In addition to the impermissible hindsight reasoning employed in combining Iwamura with Sugita et al. and Tanaka et al., impermissible hindsight reasoning was also used in combining Tanaka et al. with Sugita et al. The Examiner noted that Tanaka et al. teach that mounts (123, 130) give the housing structure that allows it to withstand the load concentration on the mount. The Examiner's position is totally unsupported by the references. Tanaka et al. discuss positioning a reinforcement member (300) about a mount (82) to reduce the load concentration on the mount (82). There is no suggestion at all in Tanaka et al. of bolts penetrating the end plates. One of ordinary skill cannot achieve the claimed configuration based on the prior art disclosures because no combination of the cited references suggests the specific configuration of the fuel cell stacks, stacking bolt, and bolt which

penetrates the end plate. Therefore, Appellant's own disclosure must have been relied on to reconstruct the claimed fuel cell assemblies.

Therefore, neither Sugita et al., Tanaka et al., nor Iwamura disclose a bolt which penetrates an end plate in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack, as required by claim 15.

**Response to Arguments**

The Examiner maintained that a bolt disposed through a fluid supply/discharge block would have been obvious and does not understand how one of ordinary skill would be unable to move a bolt within a fuel cell stack. Contrary to the Examiner's findings as explained herein, there is simply no suggestion in the cited references to provide the structure where the stacking bolt and the bolt are arranged in the claimed configuration.

In the December 6, 2010 Office Action, the Examiner maintained that Sugita et al. and Tanaka et al. are analogous references. Unlike the present invention, Sugita et al., and Tanaka et al., Iwamura is not directed to a fuel cell stack, but rather, to a group of cylindrical batteries. Furthermore, Iwamura is not reasonably pertinent to improving the supporting structure of a vehicle-mounted fuel cell stack. The Examiner defines the field of endeavor as "housing structures." The Examiner's definition is unreasonably broad, as "housing structures" would apply to any container, box, bag, enclosure, etc. One of skill in this art would not consider every possible housing structure. Rather, one of ordinary skill in this art would consider housing structures that were reasonably pertinent to housing a fuel cell stack. For example, as shown in Sugita et al. and Tanaka et al. fuel cell stacks comprise a series of substantially parallel plates in tight, physical contact with each immediately adjacent plate, and stacked together in a stacking direction. Iwamura, on the other hand teaches a container holding a plurality of

self-contained, cylindrical enclosures. There is no requirement that the cylinders in Iwamura be held in tight, physical contact with each immediately adjacent plate. Because each individual cylinder in Iwamura is sealed, it is not necessary that the cylinders be in tight, physical contact. In fact, Figs. 1 and 2 of the Iwamura show that immediately adjacent cylinders are not in physical contact. Therefore, it is readily apparent that the problems facing one of ordinary skill in the art of fuel cells, such as maintaining the integrity of a fuel cell stack, would be of no concern to Iwamura, and are not addressed by the disclosure of Iwamura.

As made clear in USPTO 2010 KSR Examination Guidelines Update, when substituting one known prior art element from a different field of endeavor for another known prior art element it is necessary to consider the problem being solved. Iwamura, which is directed to a housing for a plurality of batteries, not a housing of fuel cell stack, is not concerned at all with maintaining the substantially parallel plates of a fuel cell stack in tight, physical contact.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge readily available to one of ordinary skill in the art. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006); *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). There is no suggestion in Sugita et al., Tanaka et al., or Iwamura to modify the fuel cell assembly of Sugita et al. so that it includes a stacking bolt which penetrates the pair of end plates in the fixed direction and maintain the plural fuel cells in a stacked state, and a bolt which penetrates an end plate in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack, as required by claim 15, nor does common sense

dictate such modifications. The Examiner has not provided any evidence that there would be any obvious benefit in making such modifications of Sugita et al., rather there appear to be many shortcomings to the asserted modifications, as explained above. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 422 (2007).

The **only** teaching of the claimed fuel cell assemblies is found in Appellant's disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must not be based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The Examiner asserted Appellant argued against the references individually and that one cannot show nonobviousness where the rejections are based on the combinations of references. Contrary to the Examiner's assertions, it is clear that Appellant's arguments herein are directed to the nonobviousness of the Examiner-asserted combination of references. Appellant's arguments concerning Iwamura are all directed to showing that Iwamura does not teach certain limitations and that the deficiencies of Iwamura are not cured by the other cited references.

### **Claims 18-23 and 25-27**

#### Examiner's Position:

The Examiner asserted that Sugita et al. teach a fuel cell system having two fuel cell stacks with end plates at both ends (16, 24) for use in a vehicle. The Examiner averred that stacking bolts (154) maintain the cells in a stack. The Examiner acknowledged that Sugita et al. fail to teach a case and that the bolts holding the fuel cell stack to the vehicle penetrate an end plate and the case. The Examiner asserted that Tanaka et al. teach a fuel cell having a housing case (10) that provides mounts (123, 130) for fixing the end plates of the fuel cell and case using bolts (104), and that the mounts give

the housing structure that allows it to withstand the load concentration on the mount. The Examiner opined that it would be desirable to use the case of Tanaka et al. to provide protection to the fuel cell from the outside environment and that it would be desirable to use the mounts of Tanaka et al. to allow the case to withstand the load concentration on the mount and the mounts attach the fuel cell system to the vehicle.

The Examiner admitted that Sugita et al. in view of Tanaka et al. fail to teach that both ends of the bolt are located exterior to the case. The Examiner asserted that Iwamura teaches a through bolt (27) passing through the casing (9) and that the bolt goes from the first side to the second side of the end plate, or casing. The Examiner considered it obvious to extend the bolts (166 a, b) of Tanaka et al. from the first side to the second side of the endplate to prevent loosening of the module.

Appellant's Position:

Sugita et al., Tanaka et al., and Iwamura, whether taken in combination, or taken alone, do not suggest the claimed fuel cell assembly because the cited references do not disclose a fuel cell stack comprising plural fuel cells stacked in a fixed direction, a stacking bolt disposed along the fixed direction to maintain the plural fuel cells in a stacked state, a fluid supply/discharge block, a case housing the fuel cell stack and the fluid supply/discharge block, and a bolt which penetrates the fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack, as required by claim 18.

The fuel cell assembly of claim 18 improves the supporting structure of a vehicle-mounted fuel cell stack by firstly providing a stacking bolt to bear the load exerted in the fixed direction by the fuel cell stack and secondly providing a bolt that penetrates the fluid supply/discharge block in a direction

perpendicular to the fixed direction, wherein both ends thereof are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack. This arrangement of the bolt causes the load exerted in the fixed direction by the fuel cell stack to be distributed over the entire length of the bolt, thereby achieving an improved supporting structure of a vehicle-mounted fuel cell stack.

**The cited references do not disclose or suggest the claimed bolts**

The Examiner erroneously found that bolt of Sugita et al. in view of Tanaka et al. and Iwamura is the same as the claimed bolt. As explained herein, such a finding can only be arrived at by hindsight reconstruction of the claimed invention using Appellant's disclosure as a roadmap.

In the device of Sugita et al., the bolt shown in Fig. 2 (near the reference sign 162a(b)) is fixed only to a bottom the end plate (24) and does not penetrate the end plate (24) in a direction perpendicular to the fixed direction.

In the device of Tanaka et al., similarly, the bolt (104) is fixed only to a bottom of the end plate (62) (cf. Fig. 3) and does not penetrate the end plate (62) in a direction perpendicular to the fixed direction.

Iwamura shows a through bolt (27) penetrating a case (9) accommodating a plurality of batteries (1). However, the battery (1) is very different from a fuel cell. Further, the batteries (1) shown in Fig. 3 of Iwamura are arranged with a gap. Providing that this direction corresponds to the fixed direction defined in claim 18, it is clear that no load is exerted on the through bolt (27) in the fixed direction by the batteries (1). Hence, the through bolt (27) of Iwamura does not function to bear a load exerted in the fixed direction by the fuel cell stack, as required by claim 18.

A bolt that penetrates the fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends thereof are fixed to the case to bear a load exerted in the fixed direction

by the fuel cell stack, according to claim 18, is not disclosed or suggested by any of the cited references.

Claim 18 defines a bolt which penetrates the fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack. According to claim 18, the fluid supply/discharge block is fitted to an end of the fuel cell stack to supply fluid from outside to each of the plural fuel cells and discharge fluid from each of the plural fuel cells to a case housing the fuel cell stack and the fluid supply/discharge block

According to the Examiner, Sugita et al. teach bolts within the brackets that are perpendicular to the fixed direction of the fuel cell stack (170a in Figure 2). The bolt (170a) of Sugita et al. penetrates the attachment plate (31), the rubber mount (168), and the bracket section (160a) of the mounting mechanism (30) and a nut (174) is secured on the protrusion part thereof (Figure 2, col. 6, line 64 through col. 7, line 10).

It is clear that the bolt (170a) of Sugita et al. does not penetrate the fluid supply/discharge block. Further, an end of the bolt (170a) of Sugita et al. is fixed to the attachment plate (31) and another end thereof is fixed to the bracket section (160a). The bracket section may be regarded as a part of a case, but the attachment plate (31) is a part of a vehicle (col. 3, lines 27-29). Unlike the bolt (170a) of Sugita et al. the bolt according to claim 18 has both ends that are fixed to the case. The bolt (170a) of Sugita et al. is therefore not comparable to the bolt defined in claim 18. Tanaka et al. and Iwamura do not cure these deficiencies of Sugita et al.

The present invention is further distinguishable from any combination of Iwamura with the other cited references because combining Iwamura with Sugita et al. and Tanaka et al., even if it were obvious to do so, and Applicant maintains it is not, would not result in the claimed fuel cell assembly

structure.

**Iwamura does not disclose the stacking direction**

The batteries (1) of Iwamura are not stacked like the fuel cells of the present invention, and therefore, Iwamura does not define a stacking direction. Rather, the batteries of Iwamura are held in place by circular recesses in the supports (2, 3). Hence it is not possible to specify a stacking direction in Iwamura. The fixed direction in claim 18 is defined by the stacking direction of the fuel cells. If there is no defined stacking direction it is not possible to arrange the bolt to penetrate a fluid supply/discharge block in a **direction perpendicular to the fixed direction**, or the stacking direction, as in claim 18.

**Iwamura does not disclose both ends of the bolt are located on the exterior of the case**

Further, Iwamura does not disclose that bolt (27) penetrates the stacked casing (8, 9) such that both ends of the bolt are located on the exterior of the case, as required by claim 18. There is no disclosure or figure showing both ends of bolt (27) are located on the exterior of casings (8, 9) to support the fuel cell stack to the casings (8, 9).

**Iwamura does not disclose both claimed bolt**

Furthermore, the Examiner does not specify which bolt is the stacking bolt in Iwamura. If the bolt (27) of Iwamura corresponds to the bolt which penetrates a fluid supply/discharge block of claim 18, respectively, there must be a stacking bolt that is perpendicular to the bolt (27). Iwamura, however, does not disclose or suggest such a stacking bolt.

The Examiner found, "Iwamura further teaches a through bolt 27 passing through the casing (9),

which serves as an endplate because it is located at the end of the row batteries and holds them in a row" (final Office Action, page 6, lines 3-5). The bolts (27), however, do not hold the batteries in a row. As clearly shown in Figs. 2 and 3, the batteries are held in rows by the recess in the supports (2, 3).

While the Examiner might consider the batteries 1 of Iwamura shown in FIG. 6 are stacked horizontally and the members (9) serve as the end plates as a result of the bolts (27) penetrating each of the members (9), this interpretation of Iwamura would not suggest the claimed fuel cell structure, because there is **no stacking bolt** in Iwamura, which penetrates the pair of end plates or fluid supply/discharge block in the fixed direction and maintains the plural fuel cells in a stacked state.

The present claims require both a stacking bolt in the fixed direction and a bolt which penetrates an end plate or fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack. No combination of the cited references suggests the specific configuration of the fuel cell stacks, stacking bolt, and bolt which penetrates a fluid supply/discharge block.

It is readily apparent that the Examiner's basis for concluding that it would have been obvious to combine the cited references in the manner asserted is rooted in impermissible hindsight reasoning in view of Appellant's disclosure.

### Hindsight reasoning

In addition to the impermissible hindsight reasoning employed in combining Iwamura with Sugita et al. and Tanaka et al., impermissible hindsight reasoning was also used in combining Tanaka et al. with Sugita et al. The Examiner noted that Tanaka et al. teach that mounts (123, 130) give the

housing structure that allows it to withstand the load concentration on the mount. The Examiner then reaches an unsupported conclusion that it would be desirable for the bolts of Sugita et al. to penetrate the supply block instead of a bracket since it would provide more support for the fuel cell system by changing the load concentration, as Tanaka et al. teach the importance of load concentration (page 5 of Office Action). The Examiner's position is totally unsupported by the references. Tanaka et al. discuss positioning a reinforcement member (300) about a mount (82) to reduce the load concentration on the mount (82). There is no suggestion at all in Tanaka et al. of bolts penetrating the fluid supply/discharge block. One of ordinary skill cannot achieve the claimed configuration based on the prior art disclosures because no combination of the cited references suggests the specific configuration of the fuel cell stacks, stacking bolt, and bolt which penetrates the fluid supply/discharge block. Therefore, Appellant's own disclosure must have been relied on to reconstruct the claimed fuel cell assemblies

Therefore, neither Sugita et al., Tanaka et al., nor Iwamura disclose a bolt which penetrates an end plate or fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack, as required by claim 15 or 18.

#### **Response to Arguments**

The Examiner maintained that a bolt disposed through a fluid supply/discharge block would have been obvious and does not understand how one of ordinary skill would be unable to move a bolt within a fuel cell stack. Contrary to the Examiner's findings as explained herein, there is simply no suggestion in the cited references to provide the structure where the stacking bolt and bolt are arranged in the claimed configuration.

In the December 6, 2010 Office Action, the Examiner maintained that Sugita et al. and Tanaka et al. are analogous references. Unlike the present invention, Sugita et al., and Tanaka et al., Iwamura is not directed to a fuel cell stack, but rather, to a group of cylindrical batteries. Furthermore, Iwamura is not reasonably pertinent to improving the supporting structure of a vehicle-mounted fuel cell stack. The Examiner defines the field of endeavor as "housing structures." The Examiner's definition is unreasonably broad, as "housing structures" would apply to any container, box, bag, enclosure, etc. One of skill in this art would not consider every possible housing structure. Rather, one of ordinary skill in this art would consider housing structures that were reasonably pertinent to housing a fuel cell stack. For example, as shown in Sugita et al. and Tanaka et al. fuel cell stacks comprise a series of substantially parallel plates in tight, physical contact with each immediately adjacent plate, and stacked together in a stacking direction. Iwamura, on the other hand teaches a container holding a plurality of self-contained, cylindrical enclosures. There is no requirement that the cylinders in Iwamura be held in tight, physical contact with each immediately adjacent plate. Because each individual cylinder in Iwamura is sealed, it is not necessary that the cylinders be in tight, physical contact. In fact, Figs. 1 and 2 of Iwamura show that immediately adjacent cylinders are not in physical contact. Therefore, it is readily apparent that the problems facing one of ordinary skill in the art of fuel cells, such as maintaining the integrity of a fuel cell stack, would be of no concern to Iwamura, and are not addressed by the disclosure of Iwamura.

As made clear in USPTO 2010 *KSR* Examination Guidelines Update, when substituting one known prior art element from a different field of endeavor for another known prior art element it is necessary to consider the problem being solved. Iwamura, which is directed to a housing for a plurality of batteries, not a housing of fuel cell stack, is not concerned at all with maintaining the substantially parallel plates of a fuel cell stack in tight, physical contact.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge readily available to one of ordinary skill in the art. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006); *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). There is no suggestion in Sugita et al., Tanaka et al., or Iwamura to modify the fuel cell assembly of Sugita et al. so that it includes a stacking bolt disposed along a fixed direction to maintain the plural fuel cells in a stacked state, and a bolt which penetrates an end plate or fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack, as required by claim 18, nor does common sense dictate such modifications. The Examiner has not provided any evidence that there would be any obvious benefit in making such modifications of Sugita et al., rather there appear to many shortcomings to the asserted modifications, as explained above. See *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 422 (2007).

The **only** teaching of the claimed fuel cell assemblies is found in Appellant's disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must not be based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The Examiner asserted Appellant argued against the references individually and that one cannot show nonobviousness where the rejections are based on the combinations of references. Contrary to the Examiner's assertions, it is clear that Appellant's arguments herein are directed to the nonobviousness of the Examiner-asserted combination of references. Appellant's arguments

concerning Iwamura are all directed to showing that Iwamura does not teach certain limitations and that the deficiencies of Iwamura are not cured by the other cited references.

**2. Rejection Under 35 U.S.C. § 103(a) as being unpatentable over Sugita et al. in view of Tanaka et al. and Iwamura, and further in view of Groppel**

The Examiner's Position:

The Examiner acknowledged that Sugita et al., Tanaka et al., and Iwamura fail to teach that the fluid supply/discharge block is made of an electrically nonconductive material. The Examiner asserted that Groppel teaches plastic channels for supply and discharge of reactants to a fuel cell. The Examiner concluded that it would have been obvious to use plastic channel as the piping materials in Sugita et al. since plastic materials would be more resistant to chemical wear by harsh chemicals in fuel cell systems.

Appellant's Position:

The combination of Groppel with Sugita et al., Tanaka et al., and Iwamura does not suggest the claimed fuel cell assemblies because Groppel does not cure the deficiencies of Sugita et al., Tanaka et al., and Iwamura. Groppel does not suggest a bolt which penetrates the fluid supply/discharge block and the case in a direction perpendicular to the fixed direction such that both ends of the bolt are located on the exterior of the case to support the fuel cell stack to the case, as required by claim 18.

**Conclusion**

Based upon the arguments submitted supra, Appellant respectfully submits that the Examiner's rejections under 35 U.S.C. § 103 are not legally viable. Appellant, therefore, respectfully solicits the

Honorable Board to reverse the Examiner's rejection of claims 15-23 and 25-27 as being unpatentable as evidenced by Sugita et al., Tanaka et al., and Iwamura; and claim 24 as being unpatentable as evidenced by Sugita et al., Tanaka et al., Iwamura, and Groppel. These rejections constitute harmful and reversible error and should be reversed.

Respectfully submitted,

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**CLAIMS APPENDIX**

15. A fuel cell assembly mounted in a vehicle, comprising:

a fuel cell stack comprising plural fuel cells stacked in a fixed direction and a pair of end plates which are stacked on both ends of the plural fuel cells;

a stacking bolt which penetrates the pair of end plates in the fixed direction and maintain the plural fuel cells in a stacked state;

a case housing the fuel cell stack; and

a bolt which penetrates an end plate in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case to bear a load exerted in the fixed direction by the fuel cell stack.

16. The fuel cell assembly as defined in claim 15, wherein the pair of end plates comprise a first plate made of an electrically conducting material, and the fuel cell assembly further comprises an insulating member which electrically insulates the bolt which penetrates an end plate in a direction perpendicular to the fixed direction from the first plate.

17. The fuel cell assembly as defined in claim 15, further comprising a rubber mount gripped by a bracket fixed to the case and a bracket fixed to the vehicle.

18. A fuel cell assembly mounted in a vehicle, comprising:

a fuel cell stack comprising plural fuel cells stacked in a fixed direction;

a stacking bolt disposed along the fixed direction to maintain the plural fuel cells in a stacked state; and

a fluid supply/discharge block fitted to an end of the fuel cell stack to supply fluid from outside to each of the plural fuel cells and discharge fluid from each of the plural fuel cells to outside;

a case housing the fuel cell stack and the fluid supply/discharge block; and

a bolt which penetrates the fluid supply/discharge block in a direction perpendicular to the fixed direction, wherein both ends of the bolt are fixed to the case bear a load exerted in the fixed direction by the fuel cell stack.

19. The fuel cell assembly as defined in claim 18, wherein the fuel cell assembly further comprises a first plate supporting one end of the fuel cell stack, a second plate fixed to the other end of the fuel cell stack, and the fluid supply/discharge block is in close contact with the second plate via a gap which permits displacement of the second plate in the fixed direction.

20. The fuel cell assembly as defined in claim 19, further comprising an expansion/contraction mechanism comprising a depression formed in the fluid supply/discharge block, and a projection formed in the second plate and inserted in the depression.

21. The fuel cell assembly as defined in claim 20, wherein the expansion/contraction mechanism further comprises a passage which causes the fluid to flow through the projection between the fluid supply/discharge block and the second plate, and a seal member interposed between the projection and the depression.

22. The fuel cell assembly as defined in claim 19, wherein the second plate is made of an electrically conducting material.

23. The fuel cell assembly as defined in claim 19, wherein the fuel cell stack comprises two stack units arranged in parallel, the stack units are electrically connected in series via the second plate, the case comprises a coolant inlet and outlet, and the fluid supply/discharge block has a supply passage disposed parallel to the second plate which distributes coolant supplied to the inlet between the stack units, and a discharge passage disposed parallel to the second plate which recovers and leads coolant which has cooled the stack units to the outlet.

24. The fuel cell assembly as defined in claim 19, wherein the fluid supply/discharge block is

made of an electrically nonconductive material.

25. The fuel cell assembly as defined in claim 18, further comprising a rubber mount gripped by a bracket fixed to the case and a bracket fixed to the vehicle so as to support the case in the vehicle.

26. The fuel cell assembly as defined in claim 15, wherein the pair of end plates comprises a front end plate and a rear end plate, a fluid supply/discharge block arranged on the opposite side of the front end plate to the fuel cell stack in the fixed direction, and the bolt comprises a bolt that penetrates the fluid supply/discharge block in the direction perpendicular to the fixed direction and a bolt that penetrates the rear end plate in the direction perpendicular to the fixed direction.

27. The fuel cell assembly as defined in claim 26, further comprising a spring interposed between the front end plate and the fluid supply/discharge block.

**EVIDENCE APPENDIX**

None.

**RELATED PROCEEDINGS APPENDIX**

None.